# PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: CYPRESS SEMICONDUCTOR
CORPORATION
198 CHAMPION COURT
SAN JOSE, CA 95134

# PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)* 24 JUN 2010

| | | |
|---|---|---|
| Applicant's or agent's file reference<br>CD2009119PCT | | **FOR FURTHER ACTION**<br>See paragraph 2 below |
| International application No.<br>PCT/US 10/33626 | International filing date *(day/month/year)*<br>04 May 2010 (04.05.2010) | Priority date *(day/month/year)*<br>04 May 2009 (04.05.2009) |
| International Patent Classification (IPC) or both national classification and IPC<br>IPC(8) - G05B 15/00 (2010.01)<br>USPC - 700/1 | | |
| Applicant CYPRESS SEMICONDUCTOR CORPORATION | | |

1. This opinion contains indications relating to the following items:

- [x] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [x] Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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|---|---|---|
| Name and mailing address of the ISA/US<br>Mail Stop PCT, Attn: ISA/US<br>Commissioner for Patents<br>P.O. Box 1450, Alexandria, Virginia 22313-1450<br>Facsimile No. 571-273-3201 | Date of completion of this opinion<br>13 June 2010 (13.06.2010) | Authorized officer:<br>Lee W. Young<br>PCT Helpdesk: 571-272-4300<br>PCT OSP: 571-272-7774 |

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 10/33626

**Box No. I Basis of this opinion**

1. With regard to the **language**, this opinion has been established on the basis of:

- [X] the international application in the language in which it was filed.
- [ ] a translation of the international application into ______________ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. [ ] This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:

a. (means)
- [ ] on paper
- [ ] in electronic form

b. (time)
- [ ] in the international application as filed
- [ ] together with the international application in electronic form
- [ ] subsequently to this Authority for the purposes of search

4. [ ] In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

**WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 10/33626

**Box No. V** **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | | |
|---|---|---|---|
| Novelty (N) | Claims | 1-20 | YES |
| | Claims | None. | NO |
| Inventive step (IS) | Claims | None. | YES |
| | Claims | 1-20 | NO |
| Industrial applicability (IA) | Claims | 1-20 | YES |
| | Claims | None. | NO |

2. Citations and explanations:

Claims 1-5, 7-9, 11, 13 lack an inventive step under PCT Article 33(3) as being obvious over US 7,221,187 B1 to Snyder et al. (hereinafter "Snyder").

Regarding claim 1, a first embodiment of Snyder discloses a system comprising: a programmable analog system that is reconfigurable to perform various analog operations (col 5, ln 6-12); a programmable digital system that is reconfigurable to perform various digital operations (col 5, ln 19-24); and a microcontroller capable of reconfiguring and controlling the programmable analog system and the programmable digital system (col 4, ln 45-57), wherein the programmable digital system is configured autonomously of the microcontroller (col 2 ln 65 to col 3, ln 5). However the first embodiment of Snyder does not explicitly disclose wherein the programmable digital system is configured to control the programmable analog system. However, a second embodiment of Snyder does disclose wherein the programmable digital system is configured to control the programmable analog system (col 6, ln 1-5). It would have been obvious to one having ordinary skill in the art at the time of the applicant's claimed invention to modify a system comprising: a programmable analog system that is reconfigurable to perform various analog operations; a programmable digital system that is reconfigurable to perform various digital operations; and a microcontroller capable of reconfiguring and controlling the programmable analog system and the programmable digital system, wherein the programmable digital system is configured autonomously of the microcontroller as disclosed by the first embodiment to include wherein the programmable digital system is configured to control the programmable analog system as disclosed by the second embodiment of Snyder to reduce the consumption of the microcontroller's resources to allow the digital system to begin performing operations more quickly after a system boot.

Regarding claim 2, a first and second embodiment of Snyder teach the system of claim 1, as disclosed above. The first embodiment of Snyder further discloses further comprising a system interconnect controlled by the programmable digital system, wherein the programmable digital system is configured to direct reconfiguration of the programmable analog system and control the programmable analog system over the system interconnect (col 3, ln 11-19; col 4, ln 45-57).

Regarding claim 3, a first and second embodiment of Snyder teach the system of claim 1, as disclosed above. The first embodiment of Snyder further discloses wherein the programmable analog system includes multiple analog circuits that are reconfigurable to perform various analog data operations (col 3, ln 2-10), and wherein the programmable digital system includes multiple digital circuits that are reconfigurable to perform various digital data operations (col 3, ln 2-10).

Regarding claim 4, a first and second embodiment of Snyder teach the system of claim 3, as disclosed above. The first embodiment of Snyder further discloses wherein one or more digital circuits in the programmable digital system are configured to implement a digital controller, wherein the digital controller is configured to direct the reconfiguration of the analog circuits in the programmable analog system and direct the reconfiguration of other digital circuits in the programmable digital system (col 3, ln 1-31; col 6, ln 1-5).

Regarding claim 5, a first and second embodiment of Snyder teach the system of claim 4, as disclosed above. The first embodiment of Snyder further discloses further comprising a memory device to store configuration data that, when provided to the programmable digital system, causes the programmable digital system to reconfigure the one or more digital circuits to implement the digital controller (col 3, ln 5-10).

Regarding claim 7, a first and second embodiment of Snyder teach the system of claim 3, as disclosed above. The first embodiment of Snyder further discloses wherein the microcontroller is configured to reconfigure the one or more digital circuits in the programmable digital system to implement a digital controller (col 2, ln 42-45; col 3, ln 8-10).

Regarding claim 8, a first and second embodiment of Snyder teach the system of claim 1, as disclosed above. The first embodiment of Snyder further discloses wherein the programmable digital system is configured to direct the programmable analog system and programmable digital system to implement at least one mixed-signal application autonomously of the microcontroller (col 2 ln 65 to col 3, ln 5; col 3, ln 11-19, 51-54; col 4, ln 45-57).

--continued in Supplemental Box--

**Supplemental Box**

**In case the space in any of the preceding boxes is not sufficient.**
Continuation of:
Box No. V.2. Citations and explanations

Regarding claim 9, a first embodiment of Snyder discloses a method comprising: receiving configuration data that prompts a digital system to implement a digital control device (col 5, ln 13-27); sending, with the digital control device, one or more commands to an analog system over an interconnect controlled by the digital control device (col 4, ln 45-57), wherein the one or more commands are configured to prompt a reconfiguration of the analog system (col 4, ln 45-57); and controlling, independently of a microcontroller (col 2 ln 65 to col 3, ln 5). However the first embodiment of Snyder does not explicitly disclose and controlling, with the digital control device, analog data operations performed by the reconfigured analog system. However, a second embodiment of Snyder does disclose and controlling, with the digital control device, analog data operations performed by the reconfigured analog system (col 6, ln 1-5). It would have been obvious to one having ordinary skill in the art at the time of the applicant's claimed invention to modify a method comprising: receiving configuration data that prompts a digital system to implement a digital control device; sending, with the digital control device, one or more commands to an analog system over an interconnect controlled by the digital control device, wherein the one or more commands are configured to prompt a reconfiguration of the analog system; and controlling, independently of a microcontroller as disclosed by the first embodiment to include and controlling, with the digital control device, analog data operations performed by the reconfigured analog system as disclosed by the second embodiment of Snyder to reduce the consumption of the microcontroller's resources to allow the digital system to begin performing operations more quickly after a system boot.

Regarding claim 11, a first and second embodiment of Snyder teach the method of claim 9, as disclosed above. The first embodiment of Snyder further discloses wherein analog system including one or more analog circuits that are reconfigurable to perform the analog data operations (col 5, ln 6-12), and wherein the digital control device is configured to direct the reconfiguration of the analog circuits in the analog system and configured to control the analog data operations performed by the reconfigured analog circuits in the programmable analog system (col 4, ln 45-57).

Regarding claim 13, a first and second embodiment of Snyder teach the method of claim 9, as disclosed above. The first embodiment of Snyder further discloses wherein the configuration data is received from the microcontroller (col 2, ln 42-45; col 3, ln 8-10).

Claims 6, 10, 12, 14-20 lack an inventive step under PCT Article 33(3) as being obvious over Snyder in view of US 2008/0294806 A1 to Swindle et al. (hereinafter "Swindle").

Regarding claim 6, a first and second embodiment of Snyder teach the system of claim 5, as disclosed above. However, Snyder does not explicitly disclose further comprising a direct memory access engine to retrieve the configuration data from the memory device when the system is initially booted and send the configuration data to the programmable digital system. However, Swindle does disclose comprising a direct memory access engine to retrieve the configuration data from the memory device when the system is initially booted and send the configuration data to the programmable digital system (para [0016], [0020], [0024] and [0031]). It would have been obvious to one having ordinary skill in the art at the time of the applicant's claimed invention to modify the system of claim 5 as disclosed by the first and second embodiments of Snyder to include further comprising a direct memory access engine to retrieve the configuration data from the memory device when the system is initially booted and send the configuration data to the programmable digital system as disclosed by Swindle to reduce the consumption of the microcontroller's resources to allow the digital system to begin performing operations more quickly after a system boot.

Regarding claim 10, a first and second embodiment of Snyder teach the method of claim 9, as applied above. However, the first and second embodiment of Snyder do not explicitly disclose wherein the digital system includes one or more universal digital block devices that are reconfigurable to perform digital data operations, and wherein the configuration data, when provided to the digital system, causes the digital system to reconfigure at least one of the universal digital block devices to implement the digital control device. However, Snyder does disclose wherein the digital system includes one or more universal digital block devices that are reconfigurable to perform digital data operations (para [0024] and [0035]), and wherein the configuration data, when provided to the digital system, causes the digital system to reconfigure at least one of the universal digital block devices to implement the digital control device (para [0024], [0030] and [0035]). It would have been obvious to one having ordinary skill in the art at the time of the applicant's claimed invention to modify the method of claim 9 as disclosed by the first and second embodiments of Snyder to include wherein the digital system includes one or more universal digital block devices that are reconfigurable to perform digital data operations, and wherein the configuration data, when provided to the digital system, causes the digital system to reconfigure at least one of the universal digital block devices to implement the digital control device as disclosed by Swindle to reduce the consumption of the microcontroller's resources to allow the digital system to begin performing operations more quickly after a system boot.

Regarding claim 12, a first and second embodiment of Snyder teach the method of claim 9, as disclosed above. However, Snyder do not explicitly disclose wherein the configuration data is received from a direct memory access engine performing direct memory access operations that retrieve the configuration data from a memory device. However, Swindle does disclose wherein the configuration data is received from a direct memory access engine performing direct memory access operations that retrieve the configuration data from a memory device (para [0016], [0020], [0024] and [0031]). It would have been obvious to one having ordinary skill in the art at the time of the applicant's claimed invention to modify the method of claim 9 as disclosed by the first and second embodiments of Snyder to include wherein the configuration data is received from a direct memory access engine performing direct memory access operations that retrieve the configuration data from a memory device as disclosed by Swindle to reduce the consumption of the microcontroller's resources to allow the digital system to begin performing operations more quickly after a system boot.

--continued in Supplemental Box--

**Supplemental Box**

**In case the space in any of the preceding boxes is not sufficient.**
Continuation of:
Box No. V.2. Citations and explanations

Regarding claim 14, a first embodiment of Snyder discloses a system comprising: a programmable analog system including one or more analog circuits that are reconfigurable to perform analog data operations (col 5, ln 6-12). However, Snyder does not explicitly disclose and a programmable digital system including one or more universal digital block devices that are reconfigurable to perform digital data operations, wherein at least one of the universal digital block devices is reconfigured to implement a digital control device that controls the programmable analog system. However, Swindle does disclose and a programmable digital system including one or more universal digital block devices that are reconfigurable to perform digital data operations, wherein at least one of the universal digital block devices is reconfigured to implement a digital control device that controls the programmable analog system (para [0016], [0020], [0024] and [0031]). It would have been obvious to one having ordinary skill in the art at the time of the applicant's claimed invention to modify a system comprising: a programmable analog system including one or more analog circuits that are reconfigurable to perform analog data operations as disclosed by Snyder to include and a programmable digital system including one or more universal digital block devices that are reconfigurable to perform digital data operations, wherein at least one of the universal digital block devices is reconfigured to implement a digital control device that controls the programmable analog system as disclosed by Swindle to reduce the consumption of the microcontroller's resources to allow the digital system to begin performing operations more quickly after a system boot.

Regarding claim 15, the first embodiment of Snyder and Swindle teach the system of claim 14, as disclosed above. The first embodiment of Snyder further discloses wherein the digital control device is configured to direct the reconfiguration of the analog circuits in the programmable analog device and configured to control the analog data operations performed by the reconfigured analog circuits in the programmable analog system (col 3, ln 11-19; col 4, ln 45-57).

Regarding claim 16, the first embodiment of Snyder and Swindle teach the system of claim 14, as disclosed above. The first embodiment of Snyder further discloses further comprising a microcontroller capable of controlling the programmable analog system and the programmable digital system, wherein the programmable digital system is configured to direct the reconfiguration of the analog circuits and control the analog data operations performed by the programmable analog system independently of the microcontroller (col 4, ln 45-57).

Regarding claim 17, the first embodiment of Snyder and Swindle teach the system of claim 14, as disclosed above. The first embodiment of Snyder further discloses further comprising a system interconnect controlled by the programmable digital system, wherein the programmable digital system is configured to direct reconfiguration of the programmable analog system and control the programmable analog system over the system interconnect (col 3, ln 11-19; col 4, ln 45-57).

Regarding claim 18, the first embodiment of Snyder and Swindle teach the system of claim 14, as disclosed above. The first embodiment of Snyder further discloses further comprising a memory device to store configuration data (col 2, 56-57; col 3, ln 5-10). However, the first embodiment of Snyder does not explicitly disclose that, when provided to the programmable digital system, causes the programmable digital system to reconfigure at least one of the universal digital block devices to implement the digital control device. However, Swindle does disclose that, when provided to the programmable digital system, causes the programmable digital system to reconfigure at least one of the universal digital block devices to implement the digital control device (para [0016], [0020], [0024] and [0031]). It would have been obvious to one having ordinary skill in the art at the time of the applicant's claimed invention to modify the system of claim 14 as taught by by Snyder and Swindle to include further comprising a memory device to store configuration data as disclosed by Swindle to reduce the consumption of the microcontroller's resources to allow the digital system to begin performing operations more quickly after a system boot.

Regarding claim 19, the first embodiment of Snyder and Swindle teach the system of claim 18, as disclosed above. Swindle further discloses further comprising a direct memory access engine to retrieve the configuration data from the memory device when the system is initially booted and send the configuration data to the programmable digital system (para [0016], [0020], [0024] and [0031]).

Regarding claim 20, the first embodiment of Snyder and Swindle teach the system of claim 14, as applied above. The first embodiment of Snyder further discloses wherein the programmable analog system is configured to control the programmable digital system autonomously of a microcontroller (col 5, ln 63-66).

Claims 1-20 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used in industry.